COXA VARA.

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UNTIL very recent years, medical men only considered three lesions of the hip joint, namely, fracture of the head or neck of the femur, tubercular disease, and dislocation. All diseases referable to the hip were classed under one of these three, yet in many cases there were present lesions which could not be referred to either of the three classes, and to these unnamed conditions various names were given. For instance, in the hip we have arthritic deformities occurring the same as they occur in the wrist, or metacarpo-phalangeal joints. These arthritic deformities, if their location is in the neck of the femur, cause a change in the angular relationship of the neck to the shaft of the bone, and we have an increase of the angle with a consequent abduction of the leg, giving us the condition called coxa valga, or a lessening of the angle, giving us the condition called coxa vara.

Coxa vara is a deformity of the upper end of the femur, in which the normal angle formed by the neck and the shaft of the bone is lessened. Young seems to have evolved the best classification. It is as follows:

A. Coxa vara adolescentium.

B. Other forms of coxa vara: 1, congenital; 2, associated with congenital dislocation of the hip; 3, due to osteomalacia; 4, due to osteomyelitis; 5, due to osteitis fibrosa; 6, due to tuberculosis; 7, due to senile atrophy; 8, due to arthritis deformans; 9, due to unknown causes; 10, due to traumatism.

Coxa vara may also be classed as true coxa vara and false coxa vara. The true variety includes all those cases which arise from defective resisting power of the neck, this lessened resistance being produced by a non-inflammatory lesion, and is most common in adolescents. The false variety is caused by a lesion, the result of inflammation or traumatism. Royal

Whitman[17] claims that this deformity belongs to the same class as the knock-knee and bow-legs of adolescence.

We will consider only the coxa vara adolescentium, or true coxa vara, or, as it is sometimes called, static coxa vara. It is a non-inflammatory softening of the neck of the femur, due to defective nutrition, and is followed or accompanied by a yielding to pressure and a downward bending and torsion. (Blanchard.)

History.—In the literature no reference is made to such a condition previous to 1843, when it was mentioned by Roser.[24] It was again described in 1851 by Zeis,[25] in 1857 by Richardson,[26] who showed a case before the Philadelphia Pathological Society, in 1886 by Monks,[21] in 1888 by Keetley.[23] In 1890 Rotter[10] presented a case of coxa vara before the Medical Society of Munich. The first to call attention to it as distinct disease was Fiorani in 1881. Hofmeister of Tubingen coined the name in 1897, but Ernest Mueller first studied and described it (reporting four cases) in adolescents, in 1889. Keetley[33] claims priority to Mueller. In 1896 it was first introduced to the notice of British surgeons by Ogston of Aberdeen. Royal Whitman[17] some two years previous had in a very interesting article drawn the attention of the American physicians to it.

Etiology.—1. Congenital.—Due according to Kirmisson and Kredel to intra-uterine pressure from malposition of the fœtus in utero. Of eighty-three collected cases six occurred as congenital. Hoffa believes that congenital coxa vara is due to some arrest of growth during intra-uterine existence, probably due to some affection of the bone. He has encountered six unilateral and five bilateral cases.

2. Pathologic.—Local disease in the neck of the femur. In some cases of coxa vara where resection of the upper part of the femur was performed, rachitic changes were found in the neck of the bone. Keetley of London, England, removed a wedge-shaped piece of bone from a case; examination of the piece of bone removed showed rickets.

Frauenstein examined a specimen from a rickety child who died from other causes and found bending of the femoral neck, which was not suspected during life. Nelaton claims that local rickets, or as it is generally called, late rickets, is one of the potent causes.

Osteomyelitis also causes a weakening of the neck and a consequent deformity from pressure and torsion. (Oberst.) Arthritis deformans is classed by Young as a cause of this affection, and while it does cause a coxa vara, the lesion is not the true variety. Tuberculosis and inflammation are given by Sir Thornely Stokes as preceding factors, but according to later authorities must be excluded.

3. Structural weakness.—Owing to improper development of the lamella of the femur, the increasing weight of the body causes a sagging down of the femoral head. This likewise may be due to an inherited or relative delicacy of the structure of the bone, Mikulicz,[30] Humphrey,[22] Arndt,[31] holding this view.

4. Traumatism.—This is not a particular cause of the true coxa vara, but generally is a cause of a coxa vara, producing as it may: (1) Separation at the epiphyseal line, (2) Fracture of the neck; the fracture may be complete or incomplete.

Sudek claims that coxa vara is often of traumatic origin and is very apt to be produced by sudden weight thrown upon the femur by young persons whose bones are not yet rigid. Sprengel[32] claims that coxa vara is always traumatic and is always due to a fracture or an epiphyseal separation if it begins abruptly and with much pain and is unilateral. He also claims that separation of the epiphysis will produce a condition where the limb healing in an abnormal position will simulate coxa vara.

5. Trophoneurotic.—According to Senn the innervation of the joint may become affected, thus producing a lessened nutrition in the neck of the bone and a consequent softening. This may follow disease, as diphtheria, etc.

6. Occupation.—Kocher, Konig. This factor is active, most frequently in young males whose occupation necessitates

prolonged standing with the legs abducted as in the case of cheese-makers, also in those following some of the agricultural pursuits.

7. Arthritis deformans will cause a coxa vara, but is differentiated from the true variety in that we have inflammatory and neoplastic deposits involving the neck of the femur, especially the base. Also we find them involving the acetabulum.

8. Ostitis fibrosa.—Kuster.

9. Early rickets.—Michael Cohn.[10] Measurements of skeletons show that slight bending of the neck of the femur and slight elevation of the trochanter major are frequently encountered after severe rickets in infancy. Fabrikante[6] also maintains that coxa vara is generally due to rickets.

10. Of 83 cases of coxa vara adolescentium: 6 were congenital, 5 were between 2–5 years, 5 were between 6–7 years, 2 were between 7–8 years, 7 were between 9–10 years, 1 was between 10–11 years, 3 were between 12–13 years, 4 were between 13–14 years, 11 were between 14–15 years, 19 were between 15–16 years, 11 were between 16–17 years, 3 were between 17–18 years, 2 were between 18–19 years, 2 were between 20–21 years, 1 was 24 years. Senn has recently reported a case occurring at forty-five years. Up to 1898 only one case of coxa vara in adults had been reported and that one was due to osteomalacia (De Quervain[8]). Normally in early infancy the neck has a more obtuse angle with the shaft than it has in adult life. Humphrey[22] claims that this sinking of the neck normally terminates in adolescence and that if the condition does not terminate then, or else progresses too rapidly, we have a coxa vara developing.

11. Sex.—Of 109 cases, 83 were males, 26 were females. The cause of the rarity in females may be due to the following factors:—1, In females the shaft is more oblique. 2, The neck is shorter and stronger and lies more in a line which would represent the prolongation of the shaft. Therefore (in females) the pressure is transmitted in a more direct line than it is in the male femur and any increase in weight of the body or

disease of the bone itself would not be as apt as in the male of altering the normal angle of the neck with the shaft.

12.—Fracture was given as a cause of this condition by Kirmisson[18] in 1898, but according the interpretation of the majority of observers, the fact that fracture has occurred excludes coxa vara.

13.—Sudden over-exertion, as in the case of Mosetig. Froelich[37] of Nancy points out the resemblance which is due to the rapid growth of the subject and tarsalgia. Both are characterized by pain, muscular contraction, deformation of the bones, and sometimes arthritis of a dry type.

Pathology.—On macroscopic examination the neck of the femur is seen to form an angle less than normal with the shaft. The normal angle is—125°-126°, (Mikulicz); 126°-129°, (Lauenstein); 120°, (Porter); 130°, in children; 110° in adults, (Young); 128°, (Sir Thornely Stokes and J. Lacy Firth). In some cases of coxa vara the head may be depressed to such an extent that it is below the level of the top of the great trochanter. The angle may be less than 90°. This produces a shortening of the limb and limits its abduction. In all rickety bones the same condition is found, the line of curvature being an exaggeration of the normal. There is also a posterior curvature causing the neck of the femur to bulge anteriorly so that it sometimes can be felt as a hard lump in the base of Scarpa's triangle. This produces eversion of limb.

Bending of the neck of the bone continues and is comparatively rapid until the resistance of the compressed bone is sufficient to oppose further increase of the deformity or until the head of the bone rests upon the trochanter minor as in Hoffa's specimen. (Fig. 1.)

No inflammatory changes can be noted in or around the joint; no effusion into the joint is present. Sprengel[32] in 1898 reported two cases in whom on resection a loosening of the head of the femur in the epiphyseal line due to slight trauma was found. The characteristic deformity was present.

Histologic examination of 16 specimens showed: 3 with rachitic changes, 6 with practically normal structure, 2 with arthritis deformans, 5 with juvenile osteomalacia.

The following is an outline of the bone which Hoffa [20] obtained by resection from one of his cases.

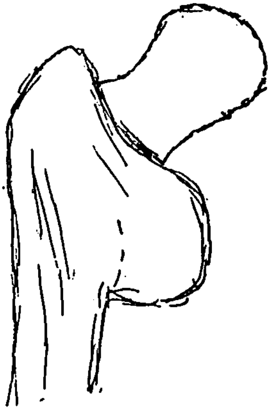

FIG. 1.—Marked bending of neck of femur. (Figure shows outline of normal neck and of neck bent down upon the lesser trochanter.—HOFFA.)

Symptoms.—1. Onset.—The onset may be sudden or gradual and the first complaints of the patient may be: (1) PAIN (shooting, Mannoch; dull aching, Firth; sharp lancinating, Case III) and tenderness in the hip joint radiating on the inner and anterior surface of the thigh to the knee. (Fowler, p. 531.) Both pain and tenderness may be absent, though a prolonged standing produces a temporary feeling of soreness in the vicinity of the right hip. On resting the limb the pain disappears to reappear when the weight of the body is again placed on the affected limb, as in my Case III; if when walking the pain would be too severe the patient always rested himself against a lamp post or against the side of a building and immediately the weight was taken off the diseased limb he found great relief, but the pain would again return on his attempting to walk. All of these may be absent and the only complaint of the patient may be: (2) a slight LIMP,—which always occurs on the affected side. This limp is due to: a shortening of the limb, (measurements being taken from either the anterior or superior spine of the femur to either: *a*, the lower border of patella, or *b*, the inner malleolus) which is both apparent and real. The real shortening, which varies from ½ to 1½ inches, is due to the faulty angulation of the neck; while the apparent shortening is due to the elevation of the pelvis on the affected side so as to permit the limb which on that side is in a position of adduction, to assume a position parallel with the other femur, the adduction may vary from 30° to 50°

Blanchard's case is:

Of the right limb.—Apparent shortening, 1.5 inches; Minus adduction shortening, .75 inch; Real shortening, .72 inch; as compared to the measurements of the left leg.

Right leg.—Adduction deformity of 30°; Rotation out of 40°; Flexion of thigh restricted, one-third. Trochanter prominent, 1 inch above Nelaton's line. Gluteal crease 1½ inch above the left.

The case is one of bilateral coxa vara. Note.—shortening of right leg, especially external rotation: also that in the (*a*) left leg 50 per cent. of abduction is lost, and that the greater trochanter lies ¾ inch above Nelaton's line, hence left leg is ¾ inch short, and since the shortening of the right leg was derived from measurements of the left, therefore the right leg is 1.5 inches short. (*b*) The limp is also partly caused by an external rotation of the femur. This is due to the traction of the muscles and ligaments, and may be as much as 40° to 60°. It is also a result of the anterior convexity of the neck.

After a short time,

2. Atrophy of the affected limb becomes apparent.

3. The gluteal crease on the affected side becomes depressed, according to Senn and Fowler, while in Blanchard's case it was elevated.

4. Right trochanter is prominent, generally (above Nelaton's line; Blanchard's case, displaced backwards).

5. Flat foot is generally present.

6. Genu valgum generally present. Keetley holds that in

many cases of genu valgum the knee deformity is a compensatory curve to a certain degree of coxa vara.

7. Temperature: fever is absent.

8. The general health of the patient is good.

9. Static scoliosis sometimes present when the affection is unilateral (Fowler).

10. Function of the hip joint. Fowler says that there is no loss of function except that due to mechanical difficulties, while Senn says that function is sometimes seriously impaired from the beginning.

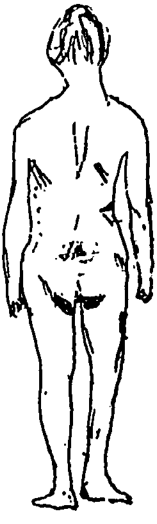

FIG. 2.

11. Gait in the bilateral variety. Because of the adduction of both thighs with inability to abduct them beyond the line representing the longitudinal axis of the body, the patient is unable to move one knee past the other and the mode of progression is as follows: One foot is advanced forward, then the other foot is brought up until its knee almost touches the popliteal space of the first; then the first is again advanced forward, etc.

12. Bryant's triangle.—The normal Bryant's triangle is

an isosceles triangle with the perpendicular and horizontal sides both equal. In a case of coxa vara generally both the horizontal and perpendicular lines are affected, the horizontal lines being shorter than the normal, showing an upward displacement of the trochanter of the femur (Fig. 4), and a consequent shortening of the neck of the bone. The perpendicular line is also increased in length, showing an eversion or turning outward of the femur, as in the case of Mannock's,[14] in which double coxa vara was present. Bryant's triangles were as follows (Fig. 3):

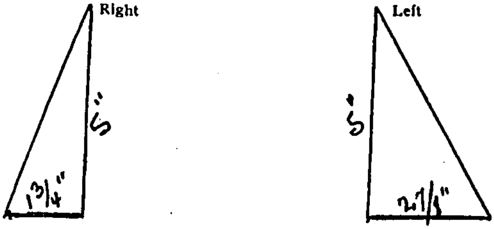

FIG. 3.—Showing variation in Bryant's triangles in a case of coxa vara.

13. Lordosis, especially in the double variety (Mannock).

14. Knock-knee frequently present.

15. Rickety signs, such as bending of the ribs, knock-knee, etc., are frequently present.

16. Abduction is limited in the bilateral variety; the thighs can only be abducted so that the two limbs are parallel with each other.

17. Adduction is unimpaired.

18. Rotation. Arc of rotation is greatly impaired. Not more than 10° on left side, not more than 15° on right side.

19. Flexion. Generally limited. When the limb is flexed beyond the point where the foot touches the knee of the opposite side, rotation of the thigh outward takes place so as to cross the extremity in tailor fashion (Ogston). Flexion of the limb increases the deformity, as may be explained by the position and shape of the acetabulum, its upper and posterior margin being most prominent. Thus it interferes with the prominent

trochanter so that on pronounced flexion the adduction takes place and the tissues are markedly distended by the projecting greater trochanter; thus, owing to the prominence of the trochanter, the assumption of the sitting position is often painful, or rather the change from the erect to the sitting position. (Whitman.[17.])

20. Thomas's test is absent. The popliteal space of the affected side comes in direct contact with the table.

21. Urine is normal.

22. Standing position in bilateral variety (Mannock's case): When standing erect with limbs close together, the toes of the right foot merely touch the heel of the left foot at an acute angle.

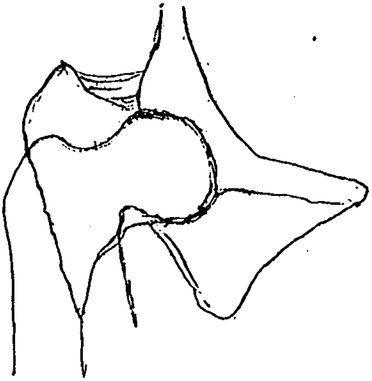

FIG. 4.—Showing elevation, trochanter major in coxa vara.*

23. Face: According to Keetley there is a characteristic alteration of the bones of the face, a sort of expansion and an appearance of thinness in the orbital and nasal regions.

When all other means of diagnosis fail and we are still in doubt, we turn to the X-ray. In the radiograph:

1. We notice no inflammatory changes in or around the joint—no fractures, no separation of the epiphysis, nothing, only an apparent difference from the normal in the angle formed by the shaft and the neck, this yielding is not only from above downward, but is also from side to side, and this

fact, if all the other conditions are excluded, makes our diagnosis.

Diagnosis.—This condition should be diagnosed from: 1, Congenital dislocation of hip; 2, hip disease; 3, local diseases, as osteomalacia; 4, traumatic coxa vara (fracture); 5, acute infantile paralysis; 6, ostitis deformans of hip.

The differentiated diagnosis is as follows:

ONSET.—Coxa vara, may be abrupt, generally gradual. Tuberculosis of head or neck of femur, slow. Fracture, abrupt, following an injury. Ostitis deformans, generally slow. Infantile paralysis, abrupt, follows fever.

MOTION.—Coxa vara, abduction and rotation generally impaired, but slightly restricted. Tuberculosis of head or neck of femur, all motion is greatly restricted. Fracture, restricted because of pain. Ostitis deformans, restricted because of new growths. Infantile paralysis, restricted because of muscular paralysis.

PAIN.—Coxa vara, slight or absent, referred to the front of the knee being carried up by the anterior crural. Tuberculosis of head or neck of femur, generally present on slight motion; referred to the back or inside of the knee carried by the genicular branch of the obturator. Fracture, present. Ostitis deformans, present. Infantile paralysis, negative.

FEVER.—Coxa vara, absent. Tuberculosis of head or neck of femur, generally present. Fracture, absent. Ostitis deformans, generally absent. Infantile paralysis, present early in disease.

DEFORMITY.—Coxa vara, early in disease may precede the pain. Tuberculosis of head or neck of femur, late in disease. Fracture, early in disease. Ostitis deformans, late in disease. Infantile paralysis, none.

TENDERNESS OVER JOINT.—Coxa vara, absent. Tuberculosis of head or neck of femur, present. Fracture, present. Ostitis deformans, often present. Infantile paralysis, none.

NOCTURNAL TWITCHINGS.—Coxa vara, absent. Tuberculosis of head or neck of femur, present. Fracture, absent. Ostitis deformans, absent. Infantile paralysis, absent.

MUSCULAR ATROPHY.—Coxa vara, slightly marked. Tuberculosis of head or neck of femur, well marked. Fracture, generally absent early in disease. Ostitis deformans, present. Infantile paralysis, present generally in a particular group of muscles.

SHORTENING.—Coxa vara, early in disease. Tuberculosis of head or neck of femur, late in disease. Fracture, immediately following accident. Ostitis deformans, slight. Infantile paralysis, absent.

AGE.—Coxa vara, generally in adolescents. Tuberculosis of head or neck of femur, young people. Fracture, generally in old people. Ostitis deformans, generally old age. Infantile paralysis, infancy.

JOINTS INVOLVED.—Coxa vara, generally unilateral, may be bilateral.

Tuberculosis of head or neck of femur, generally unilateral. Fracture, generally unilateral. Ostitis deformans, seldom or never involves only one joint. Infantile paralysis, generally both sides.

X-RAY.

ANGULATION OF NECK OF FEMUR WITH THE SHAFT.—Coxa vara, no pronounced angulation. Tuberculosis of head or neck of femur, at first not much change in the angulation. Fracture, generally pronounced. Ostitis deformans, generally no change. Infantile paralysis, no change.

ANGLE FORMED BY NECK WITH SHAFT.—Coxa vara, angle may be reduced to 60°. Fracture, generally very acute. Ostitis deformans, normal. Infantile paralysis, normal.

DIRECTION OF YIELDING.—Coxa vara, from above downward and from side to side. Tuberculosis of head or neck of femur, generally in only one direction. Fracture, generally in one direction. Ostitis deformans, none Infantile paralysis, none.

INFLAMMATORY DEPOSITS, ETC.—Coxa vara, absent. Tuberculosis of head or neck of femur, present especially about the neck of the femur. Fracture, none at first. Ostitis deformans, present about head, neck and acetabulum. Infantile paralysis, none.

ADDUCTION.—Coxa vara, present. Tuberculosis of head or neck of femur, absent? (Mannock).

ABDUCTION.—Coxa vara, absent. Tuberculosis of head or neck of femur, present.

ROTATION. Coxa vara, outward, arch of movement of the trochanter is not diminished. Tuberculosis of head or neck of femur, outward the arch of movement of the trochanter major is diminished.

Prognosis.—The prognosis depends upon the extent of the deformity of the femoral neck but in general it is good, and the functional results will be excellent. Hofmeister gave the results in thirty-two cases, in all of which the patients recovered sufficiently to return to their original work. Under five years the prognosis according to De Quervain is good, as rickets is generally the cause and under appropriate treatment it will disappear.

Treatment.—In the acute stage the patient should be put to bed and the affected limb placed in a Buck's extension or in a plaster cast; at the same time phosphorus should be exhibited to produce a stronger bone formation, and if there is any suspicion of syphilis the iodides may be used. Late in the disease massage and electricity are applied. Iron is also of great merit.

In case all these measures fail and the deformity is too great to permit of useful function, it may be corrected by operative measures. The operations recommended are:

1. Section of the adductor muscles with "brisement force." (Zehnder and Vulpius).

2. Excision of a wedge-shaped piece of bone from the anterior surface of the femoral neck. Kraske's method is: Incision 2 inches long, extending from above and inside the great trochanter downward along the inside of the tensor vaginal femoris. The anterior intertrochanteric line is thus brought into view. Periosteum and fibrous attachments are pushed off from the outer extremity of the neck, and a wedge removed with the osteotome from its base, dividing the bone at this point.

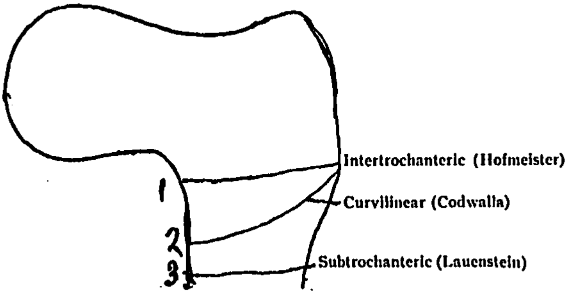

FIG. 5.—Various lines of section of femur in osteotomy for coxa vara.

This operation is condemned by Konig unless it can be done extracapsular.

3. Osteotomy: Straight linear subtrochanteric (Hofmeister); oblique linear subtrochanteric (Hoffa).

4. Resection. *a,* Of bone: Subtrochanteric (Kocher); transverse subtrochanteric (De Forest Willard). *b,* of joint: (Hoffa, Sprengel), in very grave cases of deformity. In one of Hoffa's cases by resection the shortening was reduced from 7 inches to 3 inches.

Froelich has been successful in curing coxa vara by resection of the great trochanter and rest in bed for six weeks.

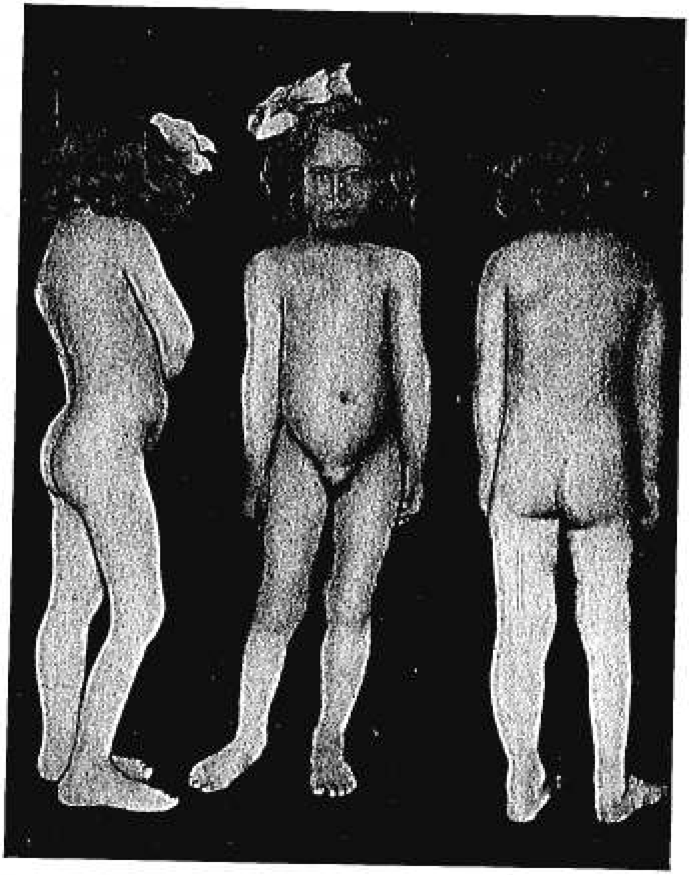

FIG. 6.—Case I. Right limb is the one affected.

REPORT OF CASES.

CASE I—Helen P (2-23-06). Onset, latter part of last July, at age of 3 years and 8 months. "Went to bed well and woke up with it. She got up out of bed and fell over." She had been complaining of slight hip pain for a day or two previously.

Paralysis of entire limb. Could not walk for one week, but finally could take a step or two.

Pain, at time of inability to walk, over entire knee. Also about two weeks ago, for a couple of weeks. At the present time the limb can be moved in all directions without pain.

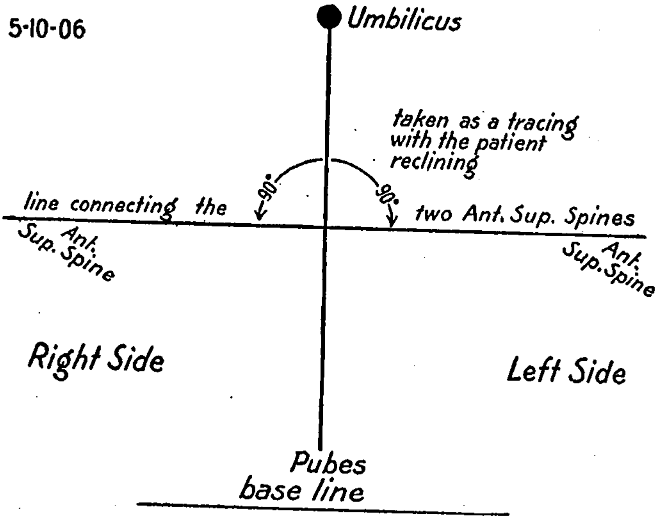
5-10-06
Umbilicus
taken as a tracing with the patient reclining
90°
90°
line connecting the two Ant. Sup. Spines
Ant. Sup. Spine
Ant. Sup. Spine
Right Side
Left Side
Pubes
base line

FIG. 7.—This shows how on reclining the tilting of the pelvis is corrected.

Motion in affected limb is improving. It has become freer though the present limitation has been present for four months.

Bowels normal, urine normal, night cries absent, appetite good.

History.—Past, very healthy, was breast fed. Family history of T. B. negative. At the time of onset of this lesion, she had no fever, no temperature, and did not seem to be at all sick except for the inability to walk.

Examination.—Position right limb. State of adduction and ext. rotation.

Atrophy.—Present; no particular group of muscles.

Motion.—No limitation of motion, either on elevation, rotation, abduction, or adduction.

Tenderness entirely absent.

Walk.—Peculiar swinging gait; wears out heel of right shoe on the inner aspect. On walking the side of the foot is on the ground and at each step she makes a peculiar double motion with the foot, apparently giving the ground a little push and then allowing the foot to slip back about one-half inch, then pushing again with it, then the foot is raised and is swung forward in a semi-circle.

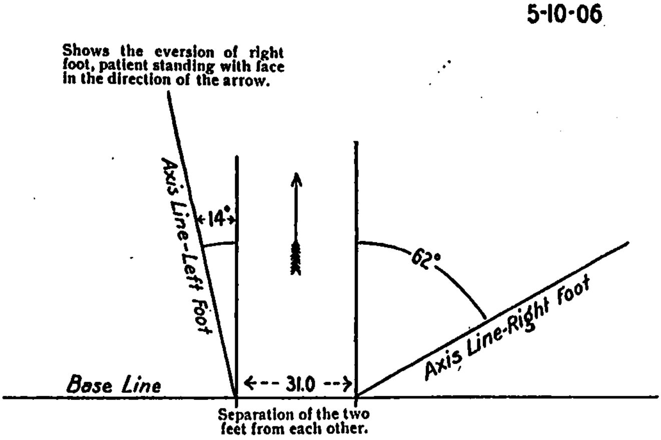
5-10-06
Shows the eversion of right foot, patient standing with face in the direction of the arrow.
Axis Line-Left Foot
14°
62°
Axis Line-Right Foot
Base Line
31.0
Separation of the two feet from each other.

FIG. 8.—Patient lying on a flat surface in a position of rest.

Bulging.—Slight tendency to bulge on inner aspect of Scarpa's triangle.

Pelvis.—Slight tilting to right, *i.e.*, right side of pelvis is lower than the left. This was taken when she was lying down.

Creases.—Gluteal crease lower on right side.

Right limb 1.0 cm. shorter than left, from anterosuperior spine to exterior malleolus. Apparent shortening, 1.5 cm. Gluteal crease not as pronounced on right side and Nelaton's line is a little higher.

Greater trochanter on right side does not seem to be any greater distance above the Nelaton's line than the greater trochanter on the left side.

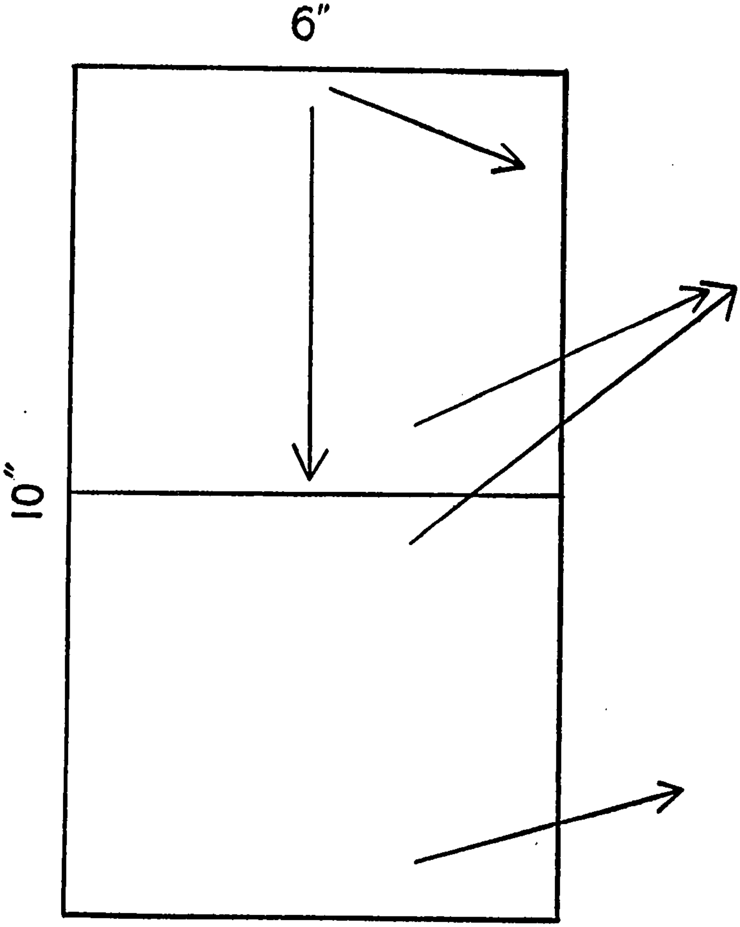

FIG. 9.

Lordosis slight; greatest curvature seems to be to the right side. On standing the anterosuperior spine on right is depressed

5 cm. and a line dropped from that point falls to the inner side of the great toe, while it falls to the outer side of foot on left side.

The right femur is adducted, while the leg itself is abducted, allowing a considerable interval between the two feet. Thus the pelvis deformity is not so great.

CASE II.—Margaret V. At present time (5-10-06), 16 years old. Onset, about two and one-half years ago, one year before the X-ray plates I here show were taken; she first noticed a slight limp on the right side, then she noticed that her dress would be higher on that hip than on the other, also that right hip was higher than the left.

Pain.—Never any pain.

History.—At seven years of age she fell off a stone wall, thirteen or fourteen feet high, landed between the wall and the house; does not remember hurting her hip at this time; there was no pain, but she fell on the present affected side. Four years ago, at twelve years of age, she fell off a fence and landed on her back; no disagreeable symptoms followed.

Examination.—No marked deformity is present. Left limb, state of exterior rotation. The adduction is possibly slight. Atrophy slight. At thigh 1.25 cm. At the calf of the leg both circumferences are the same—31 cm. Motion not much interfered with. Walk not much changed, though at the time I first saw her there was a pronounced limp. Gluteal crease is higher on left than right, though it was very slight.

Measurements.— Right anterosuperior spine to right external malleolus, 81.75; right internal malleolus, 79.5; left anterosuperior spine to left external malleolus, 81.75; left internal malleolus, 79.75.

Greater trochanter.—1.75 above Nelaton's line on the right; .25 below Nelaton's line on the left.

CASE III.—Mr. K., 42 years—clerk.

Onset.—First began about January 1, 1906, to notice a soreness in right hip; this would be particularly aggravated should he have to stand for some time.

Soreness.—Often he would lie down for a few minutes, then he would be relieved. It was always much worse towards night, while in the morning after a good sleep it would be absent. Gradually the soreness and aching increased until it became al-

FIG. 10.—Case II.

most unbearable; he says that on walking a sense of beating would be felt in the affected limb..

Pain.—On stopping and resting the limb, the pain and beating would cease, especially if he could sit or lie down. Sometimes on walking the pain would be so severe that he could not go for more than twenty-five yards without resting. The pain seemed to be present on the external surface of the limb over the greater trochanter; the bone felt as though it were jumping. Also had a slight tired feeling on the external surface of the right leg below the knee.

Limp.—About one week after he first felt the pain, a limp became noticeable; he says that his right leg would give way and be very painful whenever he would rest his weight on it.

History.—He fell down an elevator shaft, four stories in height, about three years before the development of the hip trouble. On falling he lit on both feet. No trouble was apparent afterwards until the present condition developed. In childhood he was very healthy, never being sick.

Examination.—Male. Fair state of nourishment. Right limb adducted and slightly turned in. On making pressure over the trochanter (greater) it proved rather painful. His position of greatest ease is one in which the thigh is slightly flexed; the knee bent slightly, and the foot resting on the toes of the other—the foot itself being in extension.

Scoliosis.—Left-sided.

Gait.—Slight limp on the affected side.

Gluteal depression over the prominence of the hip, the gluteal muscle is depressed.

Pelvis.—The pelvis on standing is about one-half inch lower on right than on left side.

X-ray shows a slight downward bending of the neck of the right femur. Three months after the above history was taken, I again saw the patient and found him wonderfully improved; though he still has his former limp, but to a slighter degree, the pains have disappeared and he claims he is in fairly good health.

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